

RESPIRATORY ALLERGIES CAUSED BY POLLEN AS A FACTOR OF QUALITY OF LIFE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT PROGRAMS

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Abstract

World Health Organization statistics reveal respiratory allergy as a global health problem due to its increase in prevalence, impact on school performance and productivity at work, and the economic aspect (external costs) involved. In Romania the most common is allergy to grass pollen. Grass pollen (*Dactylis*, *Poa*, *Lolium*, *Halcus*, *Cynodon*, *Festuca*, *Alopecururs*) occurs in early May and reaches a maximum between May 25 to June 10 and July 15 to 20. It is during this period that anemophyle (wind-borne) pollens increasing their allergizing ability especially if the climate is dry and hot. Rains, by driving pollen with water droplets and depositing it on the ground, lower their concentration in the atmosphere. Correlated with this phenomenon, the symptoms of graminea pollen allergies ameliorate in the rainy days, and vice versa. Paradoxically the disease incidence is higher in urban than in rural areas. But we must not ignore entomophyle (carried by insects) pollens which, although of less allergenic capacity, affect mainly florists and farmers. As a result of the surveys performed by us, we consider that preventive measures (which include all methods to prevent the patient to come into contact with symptoms-triggering allergens) should be reflected in agricultural policies and strategies for rural development programs involving extension of irrigated land areas planted with grass, screening programs for sensitivity to allergens for staff during the pollen great risks season, and the inclusion of those diagnosed with this disease in national treatment programs according to the protocols of ARIA (Allergic Rhinitis and Impact on Asthma), via inter-ministerial collaboration.

Key words: respiratory allergies, pollen, agricultural policies, rural development, sustainable development, quality of life

According to the OMS statistics, the respiratory allergy is a global health problem because of the increasing prevalence, the impact on scholar performance and labor productivity, the economic aspect (regarding their costs) and the comorbidities (asthma, rhino-sinusitis, nasal polyposis, conjunctivitis) it involves.

In Romania the most frequent allergy is to graminea pollen.

Graminea pollen (*Dactylis*, *Poa*, *Lolium*, *Halcus*, *Cynodon*, *Festuca*, *Alopecururs*) appears in early May and reaches a maximum between May 25 to June 10 and 15 to 20 July. It is during this period that these anemophilae pollens (carried by wind) increase their capacity, especially if the climate is dry and hot. Rains diminish their concentration in the atmosphere, by driving pollen with water drops and depositing them on the ground.

Correlated with this phenomenon and the symptoms of the allergics to the graminea pollen, it improves in rainy days and vice versa. Paradoxically, the incidence of this disease is higher in the urban areas than in the rural ones. But we must not ignore the entomophilae pollens either (carried by insects) as, although with a

smaller capacity, they affect especially the florists and farmers.

Allergic rhinitis is an inflammatory disease of the nasal mucous, mediated by immunoglobulin (Ig E), considered a major chronic respiratory disease due to the prevalence (approximately 40% of the population) and keeps growing. (Skoner D., 2001).

The characteristic symptoms in allergic rhinitis are: rhinorrhoea, nasal obstruction, nasal itching and sneezing in volleys, reversible either spontaneously or with therapy. Depending on the severity of the symptoms, allergic rhinitis classify into mild and moderate / severe. Classically, there is a subdivision according to the time of exposure:

- Seasonal allergic rhinitis (related to outdoor allergens, pollens, molds);
- Perennial allergic rhinitis (caused by dust mites, molds, insects- roaches, animals' epidermis, plants- ficus);
- Allergical rhinitis of occupational diseases.

Nowadays another subdivision is accepted:

- Intermittent allergic rhinitis (symptoms are present less than 4 days a week or less than 4 weeks);
- Persistent allergic rhinitis, the contrary situation.

According to the gravity, there are:

- Slight allergic rhinitis (none of the following characteristics is present: sleep disturbance, affecting daily work, school or work activity, other disturbing symptoms);
- Moderate / severe allergic rhinitis (at least one of the above features is present).

From a genetic point of view, there are no apparent predisposing genes for allergic rhinitis or asthma, but the antigens of the HLA system seem to be responsible for the allergic reactivity. Regarding the pathogenic mechanisms, the nasal allergy is considered (classic) to result from the mediated Ig E allergy, associated with the nasal inflammation of variable intensity. Pollen-induced rhinitis are the most typical Ig E – mediated allergic diseases, induced by the interaction of mediators released from cells (involved both in allergic inflammation and in non-specific hyperactivity). It is estimated that the allergens (because of their enzymatic proteolytic activity) can directly activate these cells.

Allergic rhinitis are characterized by an inflammatory infiltrate made of different cells. This cellular response includes: chemotaxis, selective recruitment and transendotelial migration of cells, cytokine and chemokine release, location of cells in different compartments of the nasal mucous, activation and differentiation of various cell types (eosinophils, T cells, mast cells, epithelial cells), prolonging their survival, releasing mediators from these activated cells (histamine, cysteinyl leukotrienes), regulating the local and systemic Ig synthesis, communicating with the immune system and bone marrow. (Lydyard D., Grossi C., 2001).

MATERIAL AND METHOD

Taking into account the impact of the respiratory allergy on the quality of life, we considered appropriate a study analyzing the relationship between the patient allergic to pollen and the habitat in which he or she lives. With this intent we realized a retrospective study on a sample of 127 patients diagnosed with respiratory allergy, both from rural and urban communities in the north-east of the country (Suceava, Iasi, Vaslui, Bacau), during 2005-2009. The diagnosis of allergic rhinitis was established being based on:

- history (which allows assessment of disease severity and response to treatment)
- general ENT examination (for the nasal examination we used previous rhinoscopia and rigid nasal endoscopy);
- allergy tests (skin, determination of specific serum Ig E);
- cytological examination of nasal secretions;
- radiological investigations (computer tomograph).

Regarding the surveillance of severe allergic rhinitis, (Dykewics M., 1998) it is considered that the measurements for the nasal flow are not self-evident and that there is a weak correlation between an objective measurement of nasal resistance and subjective reports of the sensation of nasal air flow. That's why we used the clinical surveillance of patients (according to OMS recommendations), re-examining them at 1, 2, 4 and 8 weeks. In the treatment, current guidelines (ARIA Workshop Report, 1997) propose a strategy of complex, secure and efficient approach, both for the upper airways and the lower ones. Thus, the treatment of allergic rhinitis includes:

- environmental control measures/avoidance of allergens;
- pharmacological therapy;
- specific immunotherapy with allergens;
- ENT surgery – adjunctive method, used with few patients, carefully selected.

The pharmacotherapy of allergic rhinitis (Hytonen M., et al., 1997), (Canvenberge P., 2000), (Sarafoleanu C. et al., 2003), (Dumitrașcu D., 2003) includes: antireceptor H1 antihistamines, nasal decongestants, glucocorticosteroids, cromone, anticholinergics, antileucotriene. In our study, treatment was adapted for the severity of the disease and particularities of each case as it follows:

- 1) for the form of intermittent rhinitis: antihistamine, intranasal decongestant (in mild form) and antihistamines, oral antihistamine + decongestant, intranasal glucocorticosteroid (for the moderate/ severe form);
- 2) for the form of persistent rhinitis – oral antihistamine/intranasal, oral antihistamine + decongestant, intranasal glucocortico-steroid (in mild form) and intranasal corticosteroid, intranasal glucocorticoste-roid or oral decongestant (for the moderate/severe form) (Ursu C., 2007).

RESULTS AND DISCUSSIONS

The structure analysis of the group study (*tab.1 and figs. 1 – 3*) revealed that pollen allergy is, paradoxically, more common in the urban areas (78 cases – 61.42%) than in the rural areas (49 cases – 38.58%), without significant gender differences. This could be explained by placing the patient allergic to pollen in an urban environment with more polluted air, who is exposed at home or at work to improperly adjusted air conditioning, who has a home and a diet different of the patient from the rural area.

Regarding the form and gravity of the disease (*tab.2 and figs. 4 – 6*), there were no important differences related to the distribution of the group cases: 61 cases (48, 03%) with mild form and 66 cases (51.97%) with moderate/severe disease.

Table 1

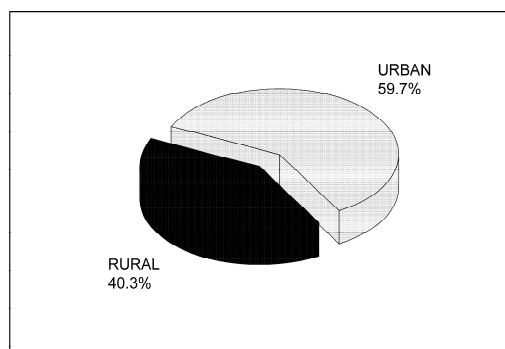
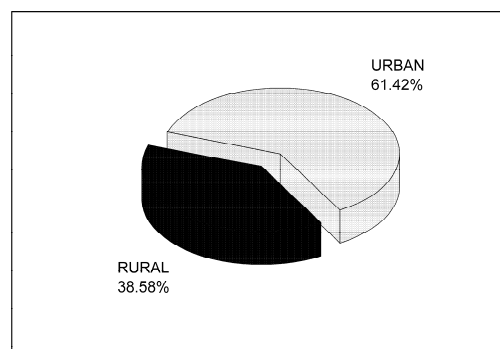
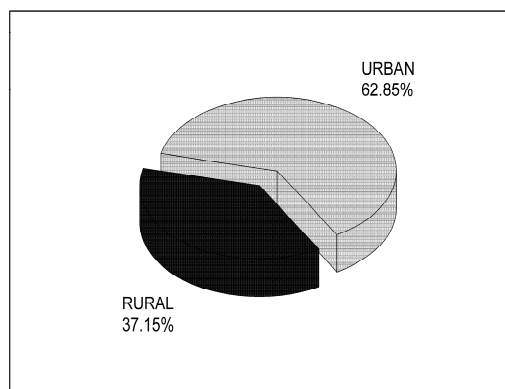
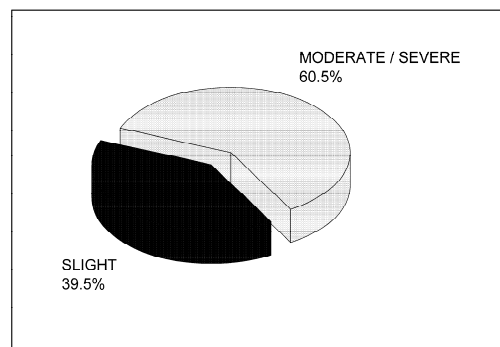
Structure of the study group by residence and gender

RESIDENCE \ GENDER	RURAL	URBAN	TOTAL
FEMALE	23 (40.3%)	34 (59.7%)	57 (100%)
MALE	26 (37.14%)	44 (62.84%)	70 (100%)
TOTAL	49 (38.58%)	78 (61.42%)	127 (100%)

Table 2

Structure of the study group by form and severity

SEVERITY \ FORM	SLIGHT	MODERATE / SEVERE	TOTAL
INTERMITTENT	32 (39.5%)	49 (60.5%)	81 (100%)
PERSISTENT	29 (63.04%)	17 (36.96%)	46 (100%)
TOTAL	61 (48.03%)	66 (51.97%)	127 (100%)

Figure 1 **Structure of the female subjects sample by residence**Figure 3 **Overall structure of the sample by residence**Figure 2 **Structure of the male subjects sample by residence**Figure 4 **Severity of the allergies with intermittent symptoms**

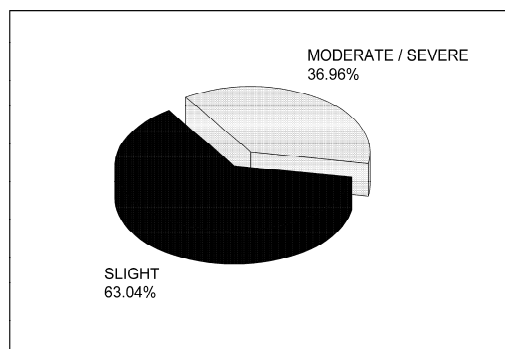


Figure 5 **Severity of the allergies with persistent symptoms**

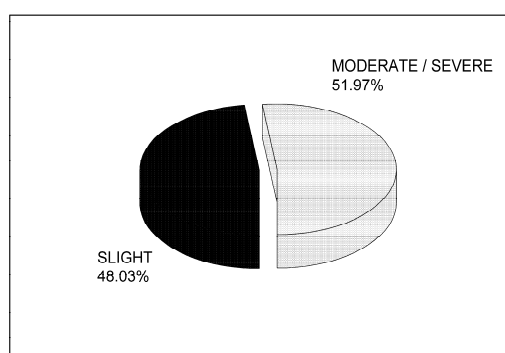


Figure 6 **Overall severity of the allergies**

The response to the treatment was different, depending on the medical features of the case, but especially on the summer weather. Thus, during hot and dry summers in the period 2005-2009, for the patients with moderate / severe allergic rhinitis, it was necessary to supplement the first line of treatment with oral corticosteroids in 52 cases (40.94%). Of these, 49 (38.58%) did not respond and this required either the addition of a nasal decongestant and an antihistamine in the schedule of treatment, or the revaluation of the case. In rainy summers there have been only seven cases (5.51%) with these needs. It is obvious that rains, by driving pollens with water drops and depositing them on the ground, lower their concentration in the atmosphere.

Correlated with this phenomenon, the symptoms of the allergic persons to the gramineae pollen improve in rainy days and the response to the treatment is faster. Conversely, anemophile pollens (transported by wind) increase their ability, especially if the climate is dry and hot, having as direct consequence an exacerbation of the symptoms and a more modest response to treatment.

CONCLUSIONS

Allergic rhinitis has become a global health problem through its importance in general morbidity and socio-professional and economic impact. Recent research on biological cells regarding the allergic flow, imposed a clinical and therapeutic reassessment of this disease. Depending on the clinical form and the evolving of the case, current guidelines offer a better-codified scheme for allergic rhinitis, starting with preventive measures. As a result of the observations, we consider that the preventive measures (including all the methods to prevent the patient to come into contact with allergens which trigger the symptoms) must be reflected in agricultural policies and strategies for rural development within the extension programs of irrigated areas cultivated with graminea, screening programs of this type of sensitivity to allergens for the staff with great risks in the pre-pollen season, including those diagnosed in national treatment programs, according to the protocols of ARIA (Allergic Rhinitis and Impact on Asthma) through inter-ministerial collaboration.

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